APPENDIX 3

ELECTRONIC COMMERCE BETWEEN BUSINESSES: ANALYSIS AND CASE STUDIES

APPENDIX 3

ELECTRONIC COMMERCE BETWEEN BUSINESSES: ANALYSIS AND CASE STUDIES

ELECTRONIC COMMERCE BETWEEN BUSINESSES

The Internet has the potential to greatly expand the value of goods and services businesses trade electronically. Estimated at more than $8 billion in 1997, the value of goods and services traded between businesses over the Internet (excluding transfer of funds or financial securities purchased) far exceeds online transactions between businesses and consumers. And, given the pace at which businesses are beginning to use the Internet to manage interactions with their business partners, it will continue to grow very rapidly. Analysts predict businesses will trade as much as $300 billion over the Internet in the next three to five years. Others think it could be much higher.[1]

Electronic commerce between businesses is not new. Businesses began sending and receiving purchase orders, invoices and shipping notifications electronically via EDI in the late 1970s. Analysts estimate that businesses already trade well over $150 billion in goods and services using EDI over private value-added networks.[2]

But, because EDI over private networks was initially expensive and required training and installation, it was out of the reach of many small and medium-sized businesses. The Internet makes electronic commerce affordable to even the smallest home office. Companies of all sizes can now communicate with each other electronically, through a web of interconnected networks including the public Internet, intranets, extranets and value-added networks.

The rapid growth of business-to-business electronic commerce is being driven by lower purchasing costs, a reduction in inventories, lower cycle times, more efficient and effective customer service, lower sales and marketing costs, and new sales opportunities.

Lower purchasing costs

Buying materials or services for a corporation can be an expensive, multi-step process. Companies lower procurement costs by consolidating purchasing and developing relationships with key suppliers to benefit from volume discounts and tighter integration in the manufacturing process. They cast a wide net for lower-cost sources of supply, and they use EDI over private networks to reduce labor, printing and mailing costs.

The Internet has the potential to further reduce procurement costs by automating previously manual tasks. It opens the door to doing business electronically with new suppliers and with small and medium-sized suppliers who formerly communicated only via fax or phone. Its global reach and real-time communication capabilities are driving the creation of new online marketplaces for production and non-production materials.

U.S. businesses spend about $250 billion each year on materials, services and supplies not used in the production process. Buying office supplies, computer equipment, and parts for maintenance, repair and operation of equipment (otherwise known as MRO supplies) is typically a manual process and can be very costly and inefficient.

Purchase orders for indirect and MRO supplies are often for low-dollar value amounts. At $80-125 on average just to cut a purchase order, processing costs alone can add significantly to the cost of a low-dollar value item. Individual divisions and offices tend to purchase their own supplies rather than consolidating purchases across the company. About 30 percent, or $83 billion, of all indirect and MRO purchases are made outside authorized contracts and cost businesses a premium of up to 50 percent.[3]

When surveyed about their plans, one out of four purchasing managers stated that they have plans to use the Internet for MRO purchasing. Fewer than 10 percent of them currently do.[4] Following are some examples of Internet-based procurement and sales marketplaces.

The Trading Process Network, a joint venture between GE Information Services and Thomas Publishing, is an Internet-based trading network linking buyers and sellers of a range of goods and services, including thermal engineering and management solutions, precision fasteners and machined parts, industrial cleaning products, plastics, contract manufacturing solutions, computers, and engineering, inspection and procurement services.

One of the solutions, TPNMart, is an electronic catalog, requisitioning and ordering solution targeting the indirect/MRO purchasing process. Buyers can search the catalog and prepare shopping lists for repeat ordering or single purchases. Solutions are customized to incorporate pricing negotiated between the buyer and the seller, and built-in approval and routing processes incorporate a company's particular buying guidelines. The system also offers purchasing card and EDI support. Professionals in sourcing departments estimate that TPNMart will lead to a 10-15 percent overall cost savings from a combination of sourcing productivity, usage control and various process quality improvements.[5]

Using TPNPost, buyers can identify qualified suppliers worldwide, distribute requests for quotes (RFQs) and specifications, transmit electronic drawings to multiple suppliers simultaneously, hold multiple bidding rounds and receive and manage bids. With TPN Post, sellers can use the Internet to find, download and view bidding projects they have been invited to bid on, prepare and submit bids to the buyer, receive results and generate reports of bidding activity.

Digital.market has created an online sourcing and procurement system for electronic components. Customers can upload parts lists, full bills of material, approved vendor lists and select their preferred distributors to serve as the basis for their request for quotes. Using this information, digital.market automatically retrieves quotes from distributors, which customers can convert to one or more purchase orders. In the next step, digital.market automatically routes the purchase order to the preferred distributor and places it in the distributor's order-entry system as an EDI

purchase transaction. Finally, digital.market delivers the order confirmation with a delivery date. Distributors pay a small transaction fee for orders placed using the service.

Wiznet Purchasing Extranet connects buyers to over 50,000 manufacturers' industrial catalogs, 5 million data sheets and product specifications from 30,000 suppliers. Each week, the Purchasing Extranet facilitates an excess of 130,000 product inquiries and more than 14,000 e-mail exchanges between suppliers and sourcing professionals.

FastParts, Inc. reports that an estimated 10 percent of annual shipments of electronic components end up as surplus inventory. In 1996, the company established a subscribers-only, Internet-based spot market patterned after the NASDAQ model to help industry participants trade semiconductors and electronic components more efficiently in the global marketplace. FastParts provides the trading facility and coordinates all trade fulfillment activities, from collecting funds to shipping parts to ensuring buyer and seller anonymity. Its revenues come from a percentage of the value of each completed trade.[6] According to FastParts, sellers recover about 50 percent of the value of their components and buyers receive a 30-50 percent discount on prices compared with prices from brokers.[7]

In Fall 1997, ChemConnect Trading Exchange had over 1,500 manufacturers, distributors and traders using its service to advertise chemicals for sale, advertise requests for quotes and sell surplus, off-specification and by-product chemicals. The service reported $320 million in requests for bids on its "Chemicals Wanted" exchange in September 1997.

Reduced Inventory/The Right Products in Stock

Having more accurate forecasts of what sells and what does not can increase inventory turns and keep the right products in stock. The Internet and private networks can be used to make sure the information gets to those who need to see it, when they need to see it.

About two years ago, the airline industry began a push to move spare parts inventory out of their hangars back to their suppliers. Boeing saw its overall order volume increase, particularly for "priority" or "rush" orders. (The longer a priority order remains unfilled, the longer an airplane could be grounded.) Boeing reacted by moving its own inventory closer to its customers, stocking it based on its customers' historical needs. It also cut its response time on routine orders from 10 days to next day and from same day to 2 hours on priority orders.

Historical experience goes a long way in ensuring that the right inventory is ready to ship when the airlines need it most. Combining history with as much information about future needs would be even more effective in ensuring the right inventory of needed parts. Because aircraft servicing is highly regulated—the FAA has guidelines about how often and how thoroughly aircraft must be serviced—many future needs can be anticipated, but that information has to be communicated from the airline to its suppliers.

Boeing envisions a system in which airlines would incorporate needs for scheduled maintenance scheduled activities directly into their spare parts ordering processes. For instance, if a part was needed, the system would first scan the database of parts in inventory and, if a match was found, assign that part to the future order. If the needed part was not already in stock, a production order could be generated and sent to the supplier well in advance of the need.

All links in the chain would be better served—airlines would have the parts when they needed them (and would be able to track the status of the parts they ordered), Boeing would be able to plan its inventory better (currently, 50 percent of Boeing's orders are high priority—if Boeing cannot find the parts in the inventory, it has to place an expedited order, sometimes meaning higher production and shipping costs that affect adversely Boeing's profit margin), and Boeing's suppliers would benefit from having to respond to fewer "expedited" orders.

For this strategy to be successful, communication from the airline to the airplane manufacturer to the supplier is critical. With the Internet's potential to reach all participants at a low cost, it will play a key role in making this work.

Over 75 percent of personal computers (PCs) are sold through third-party distribution. But lower-cost direct marketers, Dell and Gateway 2000 in particular, have been gaining market share. Compaq, Hewlett-Packard, IBM and their resellers have been gearing up their responses, and electronic commerce plays a key role.

The mid-1980s saw the birth of two computer companies that challenged the industry's reliance on third-party distribution: Dell, founded in 1984, and Gateway 2000, which followed a year later. By the 1990s, both companies had become multi-billion dollar companies by selling directly to businesses and individuals through catalogs, over the telephone, and, more recently, via the Internet. In addition, they follow a "build-to-order" model rather than the traditional "build-to-stock" model used in third-party distribution. In the build-to-order model, a computer is produced only after a customer orders it. With the price of integrated circuits and other key components dropping radically from month to month with new technological advances, postponing the ordering of these parts can significantly reduce the product's overall cost. As a result of these initiatives, Dell and Gateway typically have a 100 percent advantage in inventory turns over their competitors, resulting in lower inventory carrying costs and less risk associated with price protection and returns.[8]

Over the past year, Compaq Computer Corporation, International Business Machines (IBM) and Hewlett-Packard have begun to modify their sales and inventory practices to lower their costs and, at the same time, offer more value to their end customers. The Internet plays a key role in their strategies. It is used to locate and purchase parts, link suppliers into up-to-the-minute inventory and design information, and collaborate with suppliers and resellers on more accurate and flexible forecasts and production plans.

IBM's Authorized Assembler Program (AAP) provides an illustration. Up to 50 percent of IBM Personal Computer Co.'s volume now goes through AAP, which transfers responsibility for assembly and physically managing parts inventories from IBM to its resellers. Distributors and resellers can track current sales and inventory levels down to the individual part and use an extranet to reorder from IBM when supplies are low. By getting resellers to order from a handful of base configurations, IBM has reduced the number of PC configurations it makes from 3,000 in 1996 to 150 today and the number of different part items it manages from 50,000 to 16,000. Before IBM implemented the Internet-based AAP, resellers were only able to track inventories of already-assembled PCs. The new system keeps updated records of every part in every PC that has been shipped through a reseller. IBM plans to extend the system to PC parts suppliers, letting them ship parts directly to resellers or even end users while tracking inventories and purchases over an extranet.[9]

IBM's resellers report benefits from the new way of doing business. CompuCom's Chairman and CEO Ed Anderson relates: "In the old days, half of our orders were shipped in five days and the other half were shipped in 35 days...one of the big benefits of [channel assembly] is by getting the piece goods and components, we can make them in three days...since we started ramping up IBM volumes in February, our inventory turns have doubled or tripled."[10]

More Efficient Logistics

Matching an order with a product and then getting it to the customer in the time frame promised at as low a cost as possible is, in simple terms, the goal of a company's logistics operation. In some cases, this may involve the use of warehouses and consolidation points (where products from different parts of the world or the country get transferred to trucks or containers along with other products going to the same place). A logistics department typically work with customs agents and freight forwarders, delivery companies and handling companies. Depending on where the product comes from, whether it gets sent via express mail, truck or ship, some products can be shipped from point to point in a few hours; others might take weeks.

Ensemble, a subsidiary of the Hallmark Company, develops tailored solutions for retailers of cards, gift bags, posters and other gifts. The company finds a market need, develops a product and presents its ideas to a retailer. Its internal operations end there. Ensemble partners with companies around the world to manufacture the products. It has one partner for distribution. USCO Distribution Services of Naugatuck, Connecticut, handles all of Ensemble's order fulfillment, receipt of inbound goods, warehousing and outbound transportation in the United States. Ensemble requires USCO to ship orders in a 24-hour time period with inventory integrity and accuracy.[11]

Being able to track a product each step of the way from the factory to the end customer makes outsourcing the logistics function possible. Orders placed over the telephone, by fax or the Internet are electronically communicated to the logistics company's internal system. If the

product is in a warehouse, a picking order is automatically generated, the product is loaded onto a truck or mailed to the customer's home. Each of these processes gets recorded in the system for tracking purposes so that whoever needs to see its movement—whether the customer service representative at the logistics company or the manufacturer, or the end customer himself—knows where it is and when to expect its arrival.

The Internet not only supports the business operations of the logistics company, it also drives new business opportunities. Many businesses which use the Internet, including L.L. Bean, Insight Direct, and others, look to partners to supply and distribute their products. As retailing of tangible goods over the Internet grows, so too, will opportunities for logistics and delivery companies.

Lower sales and marketing costs

An individual sales person can handle only as many customer accounts as he can physically visit or contact by telephone. The greater the number of accounts, the greater the sales force. Even direct marketing companies whose businesses rely on people to take orders by telephone increase staffing as order volumes increase.

By contrast, a Web business can add new customers with little or no additional cost. Because its sales function is housed in a computer server rather than physical store locations or sales people, its reach is bounded only by the capacity of the servers to respond to inquiries and orders.

Boise Cascade, a $2 billion office products wholesaler, put its catalog of 10,000 parts on its Web site in January 1997. Boise expected that one to two percent of its customers would order from the site in its first year. More than 4 percent did. By the end of 1998, Boise anticipates that about 10 percent of its customers will be ordering from the Web site. The site has already paid for itself. Boise paid 'in the low hundred thousands' to set up the system. After 6 months of operation, it had saved more than $1 million by reducing the time customer service representatives take orders on the phone.[12]

The Future

Businesses that use the Internet to buy, sell, distribute and support products and services are realizing significant cost savings and increased sales opportunities. And, the benefits only increase as the network of businesses conducting electronic commerce grows.

Businesses highlight three issues as potential inhibitors to the widespread adoption of Internet commerce: the lack of a predictable legal environment, concerns that government will overtax the Internet, and uncertainty about the Internet's performance, reliability and security.

Companies are taking different approaches to address the current technical limitations. Some use the Internet to purchase lower-value, indirect materials while keeping their higher-value, direct material purchases over private value-added networks. Some are creating extranets, or "virtual private networks" that limit access to a certain pre-qualified set of businesses and their partners.

The U.S. government supports the development of both a domestic and global uniform commercial legal framework that will recognize, facilitate and enforce electronic transactions worldwide. The Government supports legislation that would prohibit imposing new discriminatory taxes on Internet commerce and it believes that no customs duties should be imposed on goods and services transmitted electronically between countries.

As the Internet's performance and reliability improve over time, and as predictable legal frameworks emerge, the growth of business-to-business electronic commerce will accelerate.

FEDERAL EXPRESS

A number of delivery and logistics companies, including Federal Express, the United Parcel Service (UPS), the U.S. Postal Service and others are using the Internet in key business processes. The example of Federal Express illustrates the role played by the Internet and private networks in improving efficiency and customer satisfaction.

Federal Express (FedEx) delivers 2.5 million packages daily to 211 countries around the world with an on-time delivery rate of 99 percent.[13]

Electronic commerce has been at the heart of FedEx's operations for more than a decade. Back in the mid-1980s, the company rolled out a program called FedEx PowerShip® that gave its major customers a window into FedEx's computer systems. Employees at shipping docks could place orders for package pick-up directly into their FedEx PowerShip terminals, automate the paperwork and track the status of their orders electronically.

In 1995, FedEx introduced FedEx Ship, a free software program that would work on any personal computer with a modem connection. Because it could be used on any PC, FedEx Ship made its way from shipping docks into other departments. Production planners that needed access to delivery status information for a rush order could now see when a supplier shipped the part and when it was due to arrive.

FedEx PowerShip and FedEx Ship® soon became the standard way of doing business with Federal Express. Two-thirds of the company's shipping transactions from 550,000 customers came via these two online services.

FedEx Connects Its Customers Electronically

Service	Date introduced	Customers using service
FedEx PowerShip®	1982	Largest customers
FedEx Ship®	1995	Mid-size/less frequent customers
interNetShip^{K}	7/1996	Any customer

In July 1996, FedEx launched FedEx InterNetShip^{K}, extending online capabilities to the Internet. Within eighteen months, 75,000 customers are using the service. A fedex.com customer can request a parcel pickup or find the nearest drop-off point, print packing labels, request invoice adjustments and track the status of their deliveries without leaving the Web site. Recipients of deliveries can request that FedEx send them an e-mail when the package has shipped.

The company's Web site is just the tip of the iceberg of FedEx's extensive use of networks. Its own proprietary network, FedEx COSMOS®, handles 54 million transactions a day. Through the

information available on the network, the company can keep track of every package every step of the way from the point a customer requests a parcel pick-up to the point it reaches its final destination. When a customer enters a pick-up request, a courier is notified electronically of the time and location. Once at the customer's office, the courier scans the bar code on the package into his hand-held system, recording that the package has been picked up. FedEx employees record and track the package's progress electronically from the van to a FedEx plane to a sorting center where it gets sorted and loaded onto another FedEx plane, to the truck that it gets unloaded onto, to the customer's home or office.

FedEx also plays a role in other companies' core logistics processes. In some instances, FedEx operates the merchant server on which a retailer's Web site runs. In others, FedEx operates warehouses that pick, pack, test and assemble products as well as handle the delivery—which sometimes involves consolidating products with other shipments and clearing customs. And the nature of FedEx's customers' products—high tech, high value or perishable—means that the orders they process have to be filled almost immediately. The information network that enables FedEx's core business to meet its delivery commitments is the same foundation for its growing logistics business as well.

Hundreds of thousands of tracking requests per month come from links from over 5,000 Web sites to fedex.com. These FedEx customers can add a product tracking feature to the other services they offer to their online customers. If a customer buys a router from Cisco Systems and wants to know when it is supposed to arrive, he does not have to make any phone calls to get the details. Instead, he can go to Cisco's Web site, enter the order number, and find out that the router is on a FedEx truck and will arrive the next morning. This information appears directly in the Cisco site in a matter of moments.

Up until five years ago, National Semiconductor (NatSemi) used to deal with a variety of different companies to get a product from its Asian factories to customers across the world, including freight forwarders, customs agents, handling companies, delivery companies and airlines. Five years ago, they decided to outsource this entire process to FedEx. Today, virtually all of NatSemi's products, manufactured in Asia by three company factories and three subcontractors, are shipped directly to a FedEx distribution warehouse in Singapore. Each day, NatSemi sends its orders electronically to FedEx. FedEx makes sure the order gets matched to a product and the product is delivered directly to the customer when promised. By going with FedEx as a one-stop shop for their logistics needs, NatiSemi has seen a reduction of the average customer delivery cycle from four weeks to one week and their distribution costs drop from 2.9 percent of sales to 1.2 percent.[14]

Not only does FedEx handle all the back-end logistics for its customers, it also leverages its vast network of technical couriers to handle customer service functions like repairs and returns. If a customer notifies a retailer that the computer he just purchased has a malfunctioning hard drive, the retailer sends an electronic message to a FedEx courier to go to the site and try to repair the hard drive, swap it out for a new one, or collect the computer and return it to the company.

Benefits to FedEx

FedEx's proprietary network forms the underpinning of the company's electronic commerce today. The Internet extends the reach of the proprietary network, electronically connecting customers that had communicated with FedEx by phone, paperwork or not at all in the past. And, as more companies sell tangible goods over the Internet with the promise of quick delivery, FedEx benefits from increased business opportunities.

For competitive reasons, FedEx has not publicly shared the full extent of benefits it has realized from information technology and electronic networks, except to say that it has enabled FedEx to continuously lower its cost to deliver each package. They point to some examples:

- *Avoided Costs*: If not for FedEx PowerShip®, FedEx would have had to hire an additional 20,000 employees to pick up packages, answer phone calls at the call centers and key in air bills. With PowerShip®, a good deal of the routine tasks are automated or transferred from FedEx to the customer. Couriers spend less time recording information at the customer's site, and phone service representatives spend less time answering calls from customers who now place orders and track their own shipments online.

- *Lower Operating Costs***:** Customers use FedEx InterNetShipᴷ to track over 1 million packages per month (and the volume increases at double-digit percentage levels month to month). Approximately half of those calls would have gone to FedEx's toll-free number instead.

- *Better Customer Service***:** Customers still have a choice for how they interact with the company, whether by phone, fax or other means. Nearly 950,000 of them find it easier and more convenient to communicate with FedEx electronically.

CISCO SYSTEMS

Cisco Systems sold $6.4 billion worth of routers, switches and other network interconnect devices during its 1997 fiscal year. As its business forms the underpinning of the Internet and private networks, it is perhaps not surprising that Cisco should be a leader in using the Internet to make its business processes more effective. From employee self-service stock options, training seminars and work team collaboration to customer service and ordering, the company continually develops new applications for business processes that it feels can be better done online than otherwise. It avoids "mega" projects. New applications are generally created within three to six months.

Cisco's Web site has evolved over several years, beginning with technical support for customers and evolving into the world's largest Internet commerce site. Today, Cisco offers nearly a dozen Internet-based applications to both end-use customers and reseller partners.

Customer Service

Cisco began providing electronic support in 1991 with a "pre-Web" system using the Internet. Software downloads, defect tracking and technical advice were the first applications. In the Spring of 1994, Cisco put its system on the Web, and re-named its site Cisco Connection Online.

Today, Cisco's customers and reseller partners log onto Cisco's Web site more than 900,000 times a month to receive technical assistance, check orders, or download software. The online service has been so well-received that nearly 70 percent of all customer service inquiries are satisfied online.

Cisco Performs Key Functions On the Internet

	% total volume	Date launched
Technical support/service	70%	1994
Ordering	40%	July '96
Software updates	90%	April '93

Figures represent share of total volume for different functions handled via Cisco's Web site.

Online Ordering

Cisco builds virtually all its products to order, so there are very few off-the-shelf products. Before the Cisco Web site, ordering a product could be complicated. Generally, an engineer at the customer site knew what type of product was needed and how it should be configured. The engineer communicated this information to the procurement department who then created the

purchase order and sent it to Cisco via fax, phone or e-mail. A Cisco customer service administrator keyed the order into Cisco's system. If the order went through "clean," it would be booked and production was scheduled within 24 hours. Nearly one out of four orders didn't get a "clean" bill of health, however. Instead, when Cisco's system tried to validate the order, it discovered an error in how the product was configured. The "dirty" order would be rejected, the customer contacted, and the procurement cycle would begin again.

Cisco began deploying Web-based commerce tools in July 1995. Then, in July 1996, the Internet Product Center allowed users to purchase any Cisco product via the World Wide Web.

Today, that same engineer can sit down at a PC, configure a product online, know immediately if there are any errors, and route the order to the procurement department. As that customer's pricing is already programmed into the Cisco site, the authorized purchaser can complete the order with a few keystrokes. And, instead of calling Cisco to find out the status of the order, invoice or account information (including the exact installation site of equipment the customer has purchased from Cisco), a customer with the proper authorization can access that information directly on the Web site.

Cisco's largest customers would like to take advantage of the features of immediate and automatic access to Cisco's online ordering, configuration and technical support tools. Because of their large volumes, however, they do not want to go into Cisco's Web site each time they place an order or have a question. A program that was launched in November 1997 interactively links the customer's and Cisco's computer systems over the Internet and private networks, so that before an order is placed, Cisco configuration and pricing tools have already validated it.

With the online pricing and configuration tools, about 98 percent of the orders go through Cisco's system the first time, saving time both at Cisco and the customer's site. Lead times have dropped 2 to 3 days, and customer's productivity has increased an average of 20 percent per order.

In the five months of its operation in 1996, Cisco booked just over $100 million of sales on the Internet. For the first 10 months of 1997, the figure grew ten-fold, to top $1 billion. If it continued selling at its December 1997 pace of over $260 million a month, Cisco would sell about $3.2 billion online in a year. The company expects to close 1998 with $4 billion in annualized online sales.

Order Status

Each month, Cisco's Web site receives about 150,000 order status inquiries. When will the order be ready? How should it be classified for customs? Is it eligible for NAFTA? What export control issues apply? Cisco gives customers the tools to find all this information on its Web site.

In addition, Cisco records a ship date, the method of shipment and the current location of each product. The company's primary domestic and international freight forwarders regularly update Cisco's database electronically with the status of each shipment, typically via EDI. The new information in the database automatically updates Cisco's Web site, keeping the customer current on the movement of the order. As soon as the order ships, Cisco sends the customer a notification message via e-mail or fax.

Benefits

In total, Cisco estimates that putting its applications online has saved the company $363 million per year, or approximately 17.5 percent of total operating costs.

With 70 percent of its technical support and customer service calls handled online, Cisco's technical support productivity has increased by 200-300 percent per year, translating to roughly $125 million lower technical support staff costs. Customers download new software releases directly from Cisco's site, saving the company $180 million in distribution, packaging and duplicating costs. Having product and pricing information on the Web and Web-based CD-ROMs saves Cisco an additional $50 million in printing and distributing catalogs and marketing materials to customers.

Cisco Saves Using Networked Business

Operating cost	Savings/year
Technical support	$125 M
Human resources	$8 M
Software distribution	$180 M
Marketing materials	$50 M
TOTAL	$363 M

*Savings represent approx.17.5% of Cisco's total operating expenses

The Future

Cisco expects online sales to grow to 60 percent of total volume over the next year. If analyst projections for Cisco's overall sales to grow to $10.5 billion by July of 1999 are correct, then its online sales should reach $5-6 billion by then.

DELL COMPUTER CORPORATION

Dell's computer business was founded on concepts that bucked conventional wisdom. While the rest of the industry was building personal computers to stock, and selling them through value-added resellers, distributors and retail stores, Dell was creating a new business model. Dell would build to order and sell the computers through its own sales force, mail order and telephone center. This way, distribution and retail markups common in the traditional channel would be avoided and Dell's inventory carrying costs would be much lower.

As of December 1997, Dell was the second largest supplier of desktop PCs, with 9.7 percent of the market and a 10-15 percent price advantage versus its major competitors who distribute their products through the indirect channel.[15]

Dell saw the advantages of the Internet and began exploiting them before others in its industry. In July 1996, Dell's customers could configure and order a computer directly from Dell's Web site. In six months' time, Dell was selling $1 million worth of computers via the Internet each day. Its volume doubled a few months later. Dell reports having sold $6 million per day several times during the 1997 holiday selling season.

Dell's Daily Online Sales and Weekly Technical Support Volumes Tripled During 1997

	1Q97	2Q97	3Q97	4Q97
Sales/day	$1 M	$2 M	$3 M	$3 M++
Tech support queries/wk	30,000	45,000	60,000	120,000
Visitors/wk	213,000	225,000	250,000	400,000
% sales outside U.S.	0	5%	10%	17%

The company's Web site also provides technical support and order status information, including the ability to download software directly from the site. The site responds to more than 120,000 technical support queries each week.

About 90 percent of Dell's overall sales are to businesses and 10 percent to consumers. Online, the customer mix is very different: about 90 percent of its sales are to small businesses and consumers. Dell's large corporate customers use Dell's Web site to get product information, order status and technical help. Most still do not place orders electronically.

Dell is working to make its online service attractive enough for its large corporate customers to use for purchasing and customer service. Customized "premier pages" allow some of its major customers to purchase Dell computers from the company's own intranet. The premier pages

incorporate the customer's corporate discounts, specific computer configurations and codes identifying those authorized to make purchases on the company's behalf. MCI estimates it has saved 15 percent in computer procurement costs due to this service. In the past, 16 purchasing agents in 4 different locations were responsible for purchasing computers. When working with Dell to develop the rules for the online service, MCI consolidated its computer purchasing (and realized a greater discount due to their higher volumes). The company also cut its purchase order cycle time from 4-6 weeks to within 24 hours.[16]

Benefits of the Internet

- *Additional revenues***:** Eighty percent of the consumers and half of the small businesses who purchased on Dell's Web site had never purchased from Dell before. One out of four say they wouldn't have purchased if it wasn't for the Web site. And, their average purchase is higher than Dell's typical customer.

- *Lower Sales/Marketing Costs*: Dell's Web site gives enough product, pricing and technical support to help guide a customer through the purchasing process—information customers previously accessed by calling a telesales representative. As a result, Dell has been able to generate an increased sales volume to its consumer market with lower labor costs. Dell expects that its advertising costs should also be lower for its Internet customers, as 30 percent of these customers had not seen a Dell ad, yet still bought online.

- *Lower Service/Support Costs***:** Dell saves several million dollars each year by having basic customer service and technical support functions available on the Internet.

  Each week, about 20,000 customers use the Web site to check their order status. Some percentage of these would have come into the call center, at a cost of $3-5 per call. If just 10 percent of these customers had called rather than using the online service, those 2,000 calls would have cost Dell $6,000-$10,000 per week.

  30,000 software files are downloaded each week from Dell's site. Answering these requests by phone and then sending each customer the software by mail would cost $150,000 per week.

  Customers who access troubleshooting tips online save Dell a $15 call to a technical support person. If 2-3 percent of the 30,000-40,000 technical information queries the Web site receives each week had reached Dell's technical support staff, it would have cost an additional $9,000-18,000 per week.

  One large customer in the auto industry reports saving $2 million in its own technical support "help desk" costs. Rather than calling up Dell's telephone support center and usually holding for about 3-5 minutes, they go to Dell's Web site for help.

- *Enhanced customer relationships***:** perhaps the greatest potential Dell sees for the Internet is its ability to enhance the company's relationship with its customers. Ultimately, one-to-one marketing and tailored customer service can be used to shorten a customer's repurchase cycle and allow them to sell more into corporate accounts. When a customer first boots up her computer, the computer introduces her to the "Dell Channel," a customer service feature tailored specifically to that customer's computer model and particular configuration. Dell believes that the ability to tailor customer service solutions and product offerings to individual customers will improve customer service and satisfaction and open up new selling possibilities.

The Future

Dell expects to conduct half its total business—sales, service and support—online shortly after the year 2000.

BOEING

Boeing's online strategy is to provide a single point of online access through which airlines and maintenance providers can "pull" the data needed to maintain and operate airplanes, regardless of whether the data is from the airframe builder, component supplier, engine manufacturer, or the airline itself. With data from all of the 300 key suppliers of airplane parts (and a growing base of data for the key engine manufacturers), Boeing's goal is to provide its customers with one-stop shopping for online maintenance information.

Spare Parts Business

Ordering spare parts has been a multi-step process for many of Boeing's customers. When a mechanic needs a part, he informs the purchasing or materials department who approves the order and sends it to Boeing via phone, fax or telex. The largest airlines began to streamline the ordering process nearly 20 years ago. Due to the volume and regularity of their orders, the largest airlines established EDI (Electronic Data Interchange) connections with Boeing over value added networks. Not all customers were quick to follow suit, however. It took until 1992 or 1993 to get 10 percent of the largest customers representing 60 percent of the volume to order through EDI. The numbers have not changed much since then.

Boeing views the Internet as a great opportunity to encourage more of its customers to order electronically. With the initial investment limited to a standard PC and basic Internet access, even its smaller customers can participate. And, because of its interactive capabilities, many customer service functions handled by the telephone center can also be handled via the Internet.

In November 1996, Boeing debuted its PART Page on the Internet, giving its customers around the world the ability to check parts availability and pricing, order parts, and track order status. Less than a year later, about 50 percent of Boeing's customers use it for 9 percent of all parts orders and a much larger percentage of customer service inquiries. In its first year of operation, the Boeing PART Page handled over half a million transactions, including inquiries, from customers around the world.

Boeing's primary objective for the PART Page was to improve service to its customers. Boeing also expects to realize significant operating savings as more of its customers communicate using the Internet. In addition, the PART Page could lead to new sales opportunities.

Some rough calculations point to productivity improvements even in its first year of production.

Boeing's spare parts business processed about 20 percent more shipments per month in 1997 than it did in 1996 with the same number of data entry people. In addition, as many as 600 phone calls to telephone service staff have been avoided because customers can access information about pricing, availability and order status online.

Over time, Boeing anticipates that the PART Page will result in fewer parts being returned because of an administrative error. Today, the person who needs the part relays that information to another individual who orders it. Sometimes one more hand-off occurs before the information gets to Boeing. These information hand-offs can result in the wrong part being shipped. If the wrong part gets shipped out, it gets returned and the cycle begins again. The PART Page eliminates the hand-offs and thereby reduces the potential for error.

The PART Page gives customers another reason for buying parts from Boeing—an easy way to order and information about the status of that order. Boeing feels that customers who are satisfied with their after-market support, they are more likely to buy parts directly through Boeing rather than a competitor and predisposed to buy Boeing aircraft the next time they make such a purchase.

Technical drawings/support

When unscheduled maintenance is required on an airplane, mechanics are traditionally forced to choose between making repeated, time-consuming trips to the crew room to consult paper or microfilm reference materials or resorting to "rip and replace" troubleshooting.

Airline maintenance is spread out over a wide geographical area. It takes place everywhere in the world the airline flies. At an airport, maintenance activities may take place at the gate, in the line-maintenance department or at the maintenance operations center.

Because information is hard to access, maintenance of aircraft is not as efficient as it could be.

Repair solutions are too open to interpretation. Mechanics may replace a part from an airplane even when it is not the cause of the problem. In 50 percent of the cases where a part has been removed and replaced with another part, there's no fault found with the original part. One European airline estimates that buying new parts or keeping additional inventory of parts to handle the "no fault found" problem costs them $12 million a year.

Documents are not suited for quick reference. Having paper and microfilm-based documents means that the mechanic has to anticipate what he needs, collect it, and then take it with him to service the airplane. If he chooses incorrectly, it may mean leaving the airplane to get the right information.

A mechanic typically has to service several different types of planes, each with its own set of instruction manuals and unique parts. When conducting a maintenance check, the mechanic's team has to review several sources to determine which repairs need to be made—enterprise data which keeps the plane's maintenance history, problems recorded by the plane's computer, and any faults the crew notes. Once the faults are identified, then information as well as parts have to be gathered and brought to the airplane.

Information may be drawn from maintenance manuals, fault isolation manuals, parts catalogs, wiring diagrams, schematics, drawings, revisions to manuals, service bulletins, FAA dispatch deviation guidelines and standards information for each model of aircraft. A single manual may contain as many as 30,000 pages. For the sixty percent of mechanics' hours that are spent on unscheduled maintenance, 30 minutes are spent just pulling together the information they need. Making sure that the right information is in the right person's hands at the right time and the right place can be a real challenge.

Boeing began its efforts to reduce the amount of paper-based technical information back in 1990, with REDARS, a system for accessing engineering drawings electronically. In March 1995, REDARS was extended to Boeing's worldwide customer base via commercial and private networks. In April 1996, Boeing On Line Data (BOLD) went into production, incorporating not only the engineering drawings but manuals, catalogs and other technical information that used to be available only in paper or microfiche format. As of October 1997, BOLD has 7,500 users across 40 customers, and another 60 customers in the pipeline.

> On a Friday in 1997, Sabena Airlines had a fire which burned down its engineering library. All the technical drawings and support documents they needed to maintain and repair their aircraft were destroyed. That afternoon, a Boeing On-line Data team went out to Sabena. Through the weekend, the team worked to set up a telecommunications line and connect Sabena to Boeing's electronic library. By Monday, Sabena's maintenance team had online access to all the technical drawings and most of the support documentation they needed.

The Portable Maintenance Aid (PMA), still in beta test, solves the next issue—making the information portable so that it can be accessed by people who need information wherever they may be working. Having that information stuck in a computer in an office is not helpful to a mechanic when he's servicing an airplane. Boeing's PMA, now available on a laptop with information on CD-ROM or a computer's hard drive (with a networked version soon to be introduced), addresses this problem. Whether at the gate, in the hangar or in the maintenance department, a mechanic or technician is able to access all the information he needs to make decisions about necessary repairs at the time and place he needs the information. All the maintenance data and part information are available electronically with an interface optimized for either troubleshooting at the gate or accessing data in the hangar.

Benefits to Boeing's customers

Little data are available to measure the full impact of BOLD or PMA as they are so new. However, even early users show benefits in:

- *Increased productivity*: spending less time searching for information frees up engineers and maintenance technicians to focus on more productive activities. One U.S. airline saved $1 million when it gave 400 users access to Boeing's REDARS program. Seeing the results of the initial implementation, the airline expanded the service to 2000 users. A European airline estimates that it will save $1.5 million from BOLD in the first year due to a nearly 4 percent boost in production and engineering staff productivity.

Airline Estimates Significant Savings from Boeing Online Maintenance Tools:

• Ownership cost:	$0.4 M
• Productivity increase:	$1.5 M
• Fewer delays:	$0.3 M
• Increased revenue:	$3 M
• Lower library/facilities costs:	$0.03M
Net Savings 1st Year	**$5 M**

Source: Boeing, using cost/benefit results from mid-sized European airline

- *Reduced costs***:** with information available online at the gate through PMA rather than back in the crew office, delays at the gate due to missing information can be reduced. The European airline mentioned above estimates that PMA will reduce delays by 5-10 percent on flights using newer Boeing aircraft.

- *Increased revenues*: every 3000 hours, an airline does a schedule C maintenance check which can keep an airline grounded for up to a week. Not having information readily available can extend the process. The longer the maintenance check, the less revenue opportunity. Through BOLD and PMA, the European airline estimates it will save 1-2 days/year for each aircraft, resulting in $3 million in incremental revenue.

GARDEN ESCAPE

"Our goal is to get to a point where a customer says I want to do my gardening the third week in April and be able to satisfy their order. No one can come close to this today." - - James O'Neill, Vice President of Operations and CFO, Garden Escape

Born of the World Wide Web, Garden Escape offers gardeners a selection of thousands of seeds, perennials, roses, bulbs, greenhouses, tools and other products from around the world from which to choose. Serious gardeners can use online software tools to design their ideal garden. Garden Escape has an online magazine, a chat room, and daily tips from the magazine's editors. Questions about horticultural terms can be answered with the help of the online glossary, or by calling Garden Escape's toll-free number. If the customer service representative does not know the answer, he will contact an expert who will send the customer a reply by e-mail.

Although not required, about 150,000 people have registered with Garden Escape in order to benefit from extra member services. Members can save graphic layouts of gardens, create a personalized notebook to keep track of their favorite varieties, planting instructions, and any other important notes. A variety of other personalized services are also available, including a gift registry and important-date reminder, personal shopper, order status, and an out-of-stock reminder service.

As the founders see it, the key to Garden Escape's eventual success is its ability to leverage the unique advantages the Internet brings. If Garden Escape simply duplicated what people could get at their local nursery, the business would not be very compelling. Instead, the site has to offer customers a shopping experience they could not easily duplicate (or duplicate at all) through traditional sources.

Garden Escape founders started by taking an inventory of all the resources a gardener uses today: nurseries and seed catalogs for plants and tools, other retailers for specialty outdoor products; books and magazines for tips on the plants and flowers that flourish or perish in certain soil and climate conditions; clubs where hobbyist gardeners share suggestions with other enthusiasts; and the extensive array of catalogs, books and CD-ROMs that help with garden design.

Next, they looked at the characteristics of the market. A $50 billion industry, the "gardening lifestyle" market includes everything needed to decorate outdoors, from plants and tools to furniture and accessories. The market is highly fragmented: almost all the best quality products come from niche suppliers. A $100 million company is a large company in this industry.

Then, they looked at the product mix a typical gardening center carries. Due to the seasonality of the business, only one-third of the product line is carried year-round: hard goods like tools, benches, and other non-perishable products. The vast majority of the inventory is seasonal: perennials for the spring and fall, antique roses for the spring, and so on.

By offering a virtual, rather than real, inventory, Garden Escape offers a selection of products that even the largest nursery could not possibly stock—10,000 products covering those that ship in the spring but bloom in the fall, products whose hardiness makes them suitable for New England but not Santa Fe, and vice versa, and an array of colors and varieties catering to different tastes.

They provide published information from horticultural experts, and using the interactive features of the Internet, they create online environments for gardeners and horticultural experts to share ideas and gardening tips.

Automated customer service saves Garden Escape money and leads to new sales opportunities. Each time Garden Escape replies to a customer's question, it stores both the question and answer in a database. That way, the knowledge base continues to expand and customer service staff (and customers in time) can search the database online and receive immediate answers. Garden Escape believes this will not only make customer service more efficient and effective, it also has the potential to generate revenues. A question from a customer in Michigan about when to plant tulips can trigger the correct technical response as well as a special promotion on tulip bulbs or books on tulips.

Growers tend to be small businesses without sophisticated ordering or production planning systems. Garden Escape's growers are no exception. About half of the company's purchase orders are transmitted to its growers by e-mail or fax. The other half are communicated over an extranet. Some suppliers can check their orders online and print out picking lists and packing labels. Then, they update Garden Escape with revised inventory levels and order shipments. Milaeger's Gardens, a supplier of perennials out of Wisconsin, reports that communicating via the extranet meant that they can handle $100,000 in orders from Garden Escape with one person instead of the three they usually require for that volume of business.

Future expectations

Although the company has yet to turn a profit, Garden Escape is confident its business model has significant advantages compared to the traditional model of distribution in the gardening industry.

Garden Escape believes that the Internet will prove to be a cost effective marketing channel relative to traditional retail and direct marketing channels. This cost structure will offer Garden Escape the flexibility to continue to invest heavily in value-added services on the Web site and offer them to its customers at no charge as well as potentially pass along savings to the customer in the form of lower retail prices. The following chart compares the costs involved when a grower retails its own products via mail order (old cost) versus a model where the grower and Garden Escape work in tandem and share business information through the Internet (new cost):

Expenses	Old Cost ($)	Old Cost (% retail)	New Cost ($)	New Cost (% retail)	Internet enables:
Production/labor	$26	26%	$20	22%	Better forecasting
Advertising/mkting	$25	25%	$2	2%	More effective marketing
Order entry/cust. service	$7	7%	$3	3%	Electronic orders
Financing/bad debt	$2	2%	$1	1%	
Rent/inventory/holding	$8	8%	$8	9%	
Pick/pack/ship	$9	9%	$6	6%	Electronic picking/packing labels
Admin. overhead	$8	8%	$5	6%	Automatic inventory updates/order status
Operating income	$15	15%	$5	6%	
Wholesale cost			$50	55%	
Garden Escape operating expenses			$23	25%	
Garden Escape operating income			$17	20%	
Customer Retail	$100	100%	$90	100%	
Shipping Costs	$10	10%	$9	10%	
Delivered Retail price	$110	110%	$99	110%	
Customer info gathering/shopping	$15	15%	$5	6%	One-stop shopping and information
Total Cost	$125	125%	$104	116%	

In the new model, Garden Escape predicts it can gain up to a 10 percent cost efficiency over traditional gardening retail channels, while maintaining profitability for both itself and its strategic growers/suppliers. Detailed information about customers' buying habits transmitted in real-time to the growers leads to better forecasting and better production planning, reducing production and labor costs. Targeted marketing to Garden Escape's members electronically instead of through catalogs and other advertising saves on printing and distribution costs. Communicating orders, inventory information and delivery status electronically reduces telephone calls and data entry costs. Because information is more timely and does not get passed through different hands, errors that cause rework and delays are also reduced. Finally, Garden Escape places a value on the time that customers spend tracking down the information and products they need to plant a garden. Garden Escape saves them time by having everything they need under one umbrella.

Garden Escape is still putting the pieces in place to realize its cost structure targets. If sales and technical integration continue at their current pace, the company anticipates it will reach them in about eighteen months.

W.W. GRAINGER, INC.

Seventy years ago, William Wallace Grainger saw an opportunity to launch a business distributing electric motors. During the 1920s, factories were converting from one large, direct current motor powering their entire assembly line operation to multiple motors using alternating current. Using a simple 8-page wholesale catalog, the MotorBook, and postcards for direct mail, Grainger began receiving and filling customer orders. Through the years, more products were added to the MotorBook as customers needs grew for a quick and convenient supply of maintenance, repair and operating (MRO) supplies.

Today, W.W. Grainger, Inc. is the leading distributor of MRO supplies and related information to the commercial, industrial, contractor and institutional markets in North America. The company is headquartered in Lincolnshire, Illinois, with operations throughout the United States and Canada, and in Mexico and Puerto Rico. In 1997, sales exceeded $4 billion. The company's numerous business units focus on serving the diverse MRO needs of more than 1.3 million customers.

The company's largest business unit, Grainger, operates through a network of national, regional, and zone distribution centers and 350 branches nationwide. Customers can place orders for MRO products via phone, fax, EDI or online over the Internet. Orders are available for same day pick-up at the local Grainger branch, or next day delivery. Grainger also provides product and service solutions to customers through its 1,600 person sales force. The MotorBook, now known as the General Catalog, continues to be a primary marketing tool for the company. The 1997 edition of the catalog is over 4,000 pages in length and contains about 80,000 products.

A key element in the growth and success of the company has been the dedication to process improvements and information systems enhancements. Computer systems were first introduced at the branch level in the 1970s. A satellite communications network was implemented in 1989 linking each branch with a network control center, enabling the instantaneous transmittal of information between the branches and distribution centers. This enhancement allows customers to call the nearest branch for complete product availability and pricing information. Today, Grainger customer service agents can check the inventory on-hand in that branch as well as all the other branches and distribution centers across the United States. The customer's order is now handled with one phone call. Having this information online has boosted both the company's service level and asset utilization. In 1997, the company further improved its communications systems with the introduction of a land-based frame relay communications network. Frame relay is faster and more reliable than the satellite system it replaced.

In spring 1995, Grainger launched its Web site, giving small and medium-sized businesses the ability to search and order from its online catalog, check product availability and pricing, and set up rules for who in the company is authorized to make a purchase from the Web site. Customers can identify and select products, check pre-negotiated account prices and determine product availability without leaving their desk, making a phone call, or generating a single piece of paper.

Not only does the site offer customers greater convenience, it also offers greater selection. Through its traditional paper catalog, Grainger has a standard product offering of about 80,000 products. Its Web site has a selection of nearly 200,000 products. In the future, Grainger plans to significantly expand its Internet product offering by partnering with other "best of class" suppliers.

Revenues from the Web site have been growing 100 percent quarter over quarter.

More than 30 percent of Grainger's online sales are to new customers or incremental sales to existing Grainger customers. Because the virtual branch is open 7 days a week, 24 hours a day, customers who would not otherwise be able to order from a Grainger are now able to do so. In fact, more than 50 percent of all orders are placed after 5 PM and before 7 AM when the local branch is closed.

Integrated supply business

In order to serve the needs of very large businesses which are looking to outsource their entire indirect materials management process, the company has developed a separate business unit known as GiSO. Targeting the three components of total cost (process, product and inventory), GiSO employees work on site as advocates for their clients, performing various management services related to indirect materials, including: business process reengineering, inventory management, supply chain management, tool crib management and information management.

By outsourcing these activities to GiSO, businesses have benefitted from total cost savings of over 20 percent, inventory reductions of up to 60 percent, process cycle time improvements of 50-80 percent and the freeing up of their company employees to focus on more core functions of their businesses such as producing automobiles, appliances or computers.

Because GiSO is paid a management fee for the value of services it provides, rather than a mark-up on the product, it is critical for GiSO to minimize any unnecessary inventory and transactions costs. This can prove to be quite a challenge considering the fact that GiSO provides access to over five million products from over 10,000 suppliers. However, through a variety of electronic means, GiSO is able to communicate directly with these suppliers to determine pricing, availability and technical information which it needs to serve its clients.

The Internet, intranet, extranet and private networks will allow GiSO employees to continue to leverage information in the execution of their jobs. This leverage and the elimination of redundant activities in the supply chain have enabled GiSO to grow at more than three times the rate of Grainger's traditional distribution business over the last two years.

GENERAL ELECTRIC

General Electric's material costs increased 16 percent between 1982 and 1992, while GE's pricing remained flat and then started to decline. In response to these cost increases, GE began an all-out effort to improve its purchasing. The company analyzed its procurement process and discovered that its purchasing was inefficient, involved too many transactions and did not leverage GE's overall volumes to get the best price. More than one-quarter of its invoices (1.25 million invoices) had to be reworked because the purchase order, receipt and invoice did not match.

Since the review, GE has taken a number of steps to improve its purchasing, the most recent of which involve the Internet.

Factories at GE's lighting division used to send hundreds of requisitions for quotations (RFQs) to the corporate sourcing department each day for low-value machine parts. For each requisition, the accompanying blueprints had to be requested from storage, retrieved from the vault, transported on site, photocopied, folded, attached to paper requisition forms with quote sheets, stuffed into envelopes and mailed out. This process took at least 7 days and was so complex and time-intensive that the sourcing department normally only sent out bid packages to two to three suppliers at a time.

In 1996, GE Lighting piloted the company's first online procurement system, TPN Post, an extranet developed by GE Information Services. Now, the sourcing department receives the requisitions electronically from its internal customers and can send off a bid package to suppliers around the world via the Internet. The system automatically pulls the correct drawings and attaches them to the electronic requisition forms. Within 2 hours from the time sourcing started the process, suppliers are notified of incoming RFQs by email, fax or EDI and are given 7 days to prepare a bid and send it back out over the Internet to GE Lighting. A bid can be awarded the same day GE receives and evaluates it.[17]

As a result of implementing TPN, GE has realized a number of benefits:

- 60 percent of the staff involved in procurement have been redeployed. The sourcing department has at least 6-8 additional days a month to concentrate on strategic activities rather than the paperwork, photocopying and envelope stuffing it had to do when the process was manual.

- Labor costs involved in procurement declined by 30 percent. At the same time, materials costs declined 5-20 percent due to the ability to reach a wider base of suppliers online.

- It used to take 18-23 days to identify suppliers, prepare a request for bid, negotiate a price and award the contract to a supplier. It now takes 9-11 days.

- With the transaction handled electronically from beginning to end, invoices are automatically reconciled with purchase orders, reflecting any modifications that happen along the way.

- Procurement departments across the world to share information about their best suppliers. In February 1997, GE Lighting found seven new suppliers via the Internet, including one that charged 20 percent less than the next-highest bid.[18]

GE reports that TPN benefits extend beyond its own walls. A computer reseller, Hartford Computer Group, reports that since joining TPN, it has increased exposure across the different GE business units—so much so that its business with the company has grown by over 250 percent. At the same time, TPN has introduced Hartford Computer Group to other potential customers.[19]

As of October 1997, eight divisions of General Electric use TPN for some of their procurement. The company bought more than $1 billion worth of goods and supplies via the Internet during the year. By 2000, the company aims to have all 12 of its business units purchasing its non-production and maintenance, repair and operations materials (MRO) via the Internet, for a total of $5 billion. GE estimates that streamlining these purchases alone could save the company between $500-$700 million annually.[20]

ENDNOTES

1. Forrester Research estimates that Internet commerce between businesses in the U.S. could reach $327 billion by 2002. See: Erwin, Blane et al. “Sizing Intercompany Commerce.” Forrester Research. July 1997.

	1997	1998	1999	2000	2001	2002
Internet commerce (all business-to-business)	$8 B	$17 B	$41 B	$105 B	$183 B	$327 B
Manufacturing	$3 B	$8 B	$17 B	$41 B	$68 B	$116 B
Wholesale/Business Retail	$2 B	$6 B	$18 B	$48 B	$89 B	$168 B
Utilities	$2 B	$2 B	$3 B	$5 B	$7 B	$10 B
Transport	—	—	—	—	—	—
Services	$1 B	$1 B	$3 B	$11 B	$19 B	$33 B

Some business executives and analysts believe that it could be much higher, given the pace at which businesses are adopting the Internet in key business applications. A very recent study by Price Waterhouse, released on March 24, 1998, reported that, “between 1996 and 1997, business-to-business trade doubled every 6 months and this is accelerating to double every 3 to 4 months in 1998. By 2002, the value of goods and services traded via the Internet globally will increase to $434 billion.” See: Retter, Terry and Calyniuk, Mike. *Technology Forecast:1998.* Price Waterhouse. March, 1998.

2. Input, a firm specializing in electronic business market research and consulting services, estimates that the worldwide value of goods and services traded between businesses via EDI over private networks was $162 billion in 1997.

   Torrey Byles, President of Granada Research, an electronic commerce research and consulting firm, estimates that U.S. businesses traded $500 billion via EDI in 1996.

   Input’s figure counts only those transactions where the entire transaction from purchase order to payment, was completed electronically. Byles’ figure includes transactions where the transaction was initiated electronically. Payments may have been received via other means.

3. http://www.tpn.geis.com

4. 1997 survey of purchasing managers by Porter Novelli for W.W. Grainger.

5. http://www.tpn.geis.com/tpn/getting_started/buyerben.htm

6. FastParts.com press releases. http://www.fastparts.com/news/art_software_strategies.html

7. Wolinsky, Howard. "Parts Trader Gets on Fast Track." *Chicago Sun Times.* November 3, 1997.

8. Zarley, Craig. "Sales, Service & CIOs - - Resellers Enlist Vendor Support to Combat Threat of Direct Model." *Computer Reseller News*. June 2, 1997. p. 5.

9. Moad, Jeff. "Extranets Turn Up Heat in PC Race." *PC Week*. September 1997.

10. "What is the ultimate goal of channel assembly programs? Is it more than just to take marketshare away from Dell and Gateway?" Panel discussion. *Computer Reseller News*. December 8, 1997.

11. Cooke, James A.. "Virtual companies need real logistics support." *Logistics Management*. November 1997. http://www.manufacturing.net

12. Aragon, Lawrence. "Finding Middle Ground." *PC Week*. September 1997. Boise Cascade's experience with the Internet provided by Laura Longcore, electronic commerce manager for Boise Cascade. http://www.zdnet.com/pcweek/sr/ecommerce/boise.html

13. Lappin, Todd. "The Airline of the Internet." *Wired*. December 1996. pp.234-240.

14. Janah, Monua and Wilder, Clinton. "Special Delivery: Think FedEx is only about delivering packages? Think again. The company's presence is being felt all over the supply chain." *Information Week*. October 27, 1997. http://www.techweb.cmp.com/iw/654/54iufdx.htm

15. Kanellos, Michael. "HP outpacing competition in growth." news.com. December 9, 1997. Market share figures from International Data Corporation. http://www.news.com/News/Item/0,4,17158,00.html

16. Dell corporate sources.

17. "'Extending the Enterprise' TPN Post Case Study - - GE Lighting." http://www.tpn.geis.com/tpn/resource_center/casestud.html

18. Ibid.

19. GE Information Services. "Extending Business Relationships: TPNPost Case Study - - Hartford Computer Group." http://www.tpn.geis.com. HCG experience related by Ron Brinckerhoff, the GE National Account Manager for Hartford Computer Group.

20. Bylinsky, Gene. "Sales are Clicking on Manufacturing's Internet Mart." tpn.geis.com. Excerpts from *Fortune*. July 7, 1997. http://www.tpn.geis.com/tpn/resource_center/fortune.htm

For more information, contact:

Secretariat for Electronic Commerce
U.S. Department of Commerce
Washington, D.C. 20230
202-482-8369